

What is claimed is:

1. (currently amended) A method to produce water soluble carbohydrates from lignocellulose, which comprises:

providing lignocellulose containing cellulose and

providing enzymes [to said cellulose], and

providing a membrane [to divide a filtrate], and

combining [the extractate, from a previous extraction, with] said lignocellulose containing cellulose with enzymes, and

[subjecting] hydrolyzing, [said] cellulose [contained in] within lignocellulose, [to hydrolysis,] at a pH of about 5, to produce water soluble carbohydrates and a lignin residue, and

conveying said lignin residue from hydrolysis, and

filtering said lignin residue [containing lignins from said water soluble carbohydrates containing enzymes] to produce a filtrate and a filtered residue, and

extracting [the] said filtered residue with water [containing lignins with water to substantially extract water soluble carbohydrates from the residue] to produce [a] water extracted residue and an extractate [for recycle], and

combining said extractate, with said lignocellulose, and

dividing said filtrate with said membrane, to provide enzymes and a solution of water soluble carbohydrates and

transferring said solution of water soluble carbohydrates, derived from said filtrate, and

combining enzymes, derived from said membrane, with cellulose within lignocellulose

[providing enzymes, derived from said membrane, to cellulose within said lignocellulose

employing said membrane to substantially divide said filtrate containing water soluble carbohydrates

and enzymes to provide water soluble carbohydrates substantially devoid of enzymes and provide

enzymes for hydrolysis of cellulose contained in said lignocellulose] thereby water soluble

carbohydrates substantially devoid of enzymes are formed from lignocellulose and a residue containing lignins substantially devoid of water soluble carbohydrates is formed.

2. (original) The method of claim 1 wherein said hydrolysis is accomplished in a vessel.

3. (original) The method of claim 1 wherein said filtrate is subjected to ultrafiltration to substantially separate enzymes from the water soluble carbohydrates and form a solution substantially devoid of enzymes and recycle the separated enzymes for subsequent hydrolysis of cellulose contained in a lignocellulose.

4. (original) The method of claim 3 wherein the, solution containing water soluble carbohydrates, is subjected to hydrolysis and fermentation to form ethanol.
5. (currently amended) The method of claim 1 wherein [said] lignocellulose is [obtained from biomass] selected from the group consisting of wood, waste paper and municipal solid waste including an individual or a combination thereof.
- 6 (original) The method of claim 1 wherein said lignocellulose is provided from dilute acid hydrolysis of a biomass to provide a lignocellulose substantially devoid of hemicellulose.
- 7 (currently amended) The method of claim 1 wherein [said] enzymes are selected from the group consisting of cellulase, glucanhydrolase and, cellobiohydrolase including an individual or a combination thereof.
8. (original) The method of claim 1 wherein said lignocellulose containing cellulose is accessible to enzymes.
9. (original) The method of claim 1 wherein said extractate contains water soluble carbohydrates.
10. (currently amended) The method of claim 1 wherein [said] water soluble carbohydrates contain glucose.
11. (currently amended) The method of claim 1 wherein [said] water soluble carbohydrates, derived by hydrolysis of lignocellulose, contain glucose polymers.
12. (currently amended) The method of claim 1 wherein [said] water soluble carbohydrates, derived by hydrolysis of lignocellulose, contain cellodextrins.
13. (currently amended) The method of claim 1 wherein [said] enzymes derived from ultrafiltration are recycled to provide enzymes to [said] cellulose contained in a lignocellulose.
14. (currently amended) The method of claim 1 wherein [said] water soluble carbohydrates, derived by hydrolysis of lignocellulose, containing enzymes are absorbed by cellulose to provide absorbed enzymes for hydrolysis of cellulose contained in a lignocellulose.
15. (currently amended) The method of claim 1 wherein [said] water soluble carbohydrates, derived by hydrolysis of lignocellulose, are subjected to hydrolysis to form glucose.
16. (original) The method of claim 1 wherein said method is continuous.
17. (original) The method of claim 1 wherein said lignocellulose is obtained from pretreated biomass.
18. (original) The method of claim 1 wherein said lignocellulose is substantially devoid of hemicellulose.
19. (original) The method of claim 1 wherein said lignocellulose is substantially sterilized.